

Process for jerk lathing and preferred process application

Patent claims

01. A lathing process for non-circular cutting on programmable lathing machines whereby a workpiece is rotated in the chuck of a machine spindle and using a traversable tool at least partial specific non-circular, discontinuous or abruptly changing contours are cut, characterised in that the turning takes place in jerks, in that the tool is synchronised to the spindle angle and the described contour comprising rounded geometrical transition elements or compound contours is generated by a program comprising jump functions created by linking command blocks with values for selected address parameters such as diameter (X), length (Z), height (Y) and pitch (F) or angle (C), whereby for at least one of these address parameters the program block chain employs a jerk, i.e. a sequence of address parameter values which build into a jump function.
02. Process in accordance with claim 1 which is characterised in that the tool is moved relative to the workpiece on a track which can be described as an alternating chain of smoothly flowing and jumping contour elements.
03. Process in accordance with claims 1 or 2 characterised in that the tool is moved relative to the workpiece on a track which only corresponds in a single or in a number of isolated sections with the final contour and in which by way of at least one preceding and/or subsequent machining cycles the superfluous, redundant, undesirable section or section non-compliant with the final contour is remachined to the final contour.
04. Process in accordance with claim 3 characterised in that the contour on the workpiece is achieved by interleaving at least two machining sequences whereby e.g. in a first sequence the first contour element is machined, and then at least the

next contour element is skipped and then a subsequent element is then machined and in at least one additional sequence the skipped contour element or elements are machined and insodoing the previously already machined contour elements are skipped.

05. Process in accordance with claim 3 characterised in that the in each case respectively machined contour sections non-compliant with the final contour are removed or remilled.
06. Process in accordance with one of claims 1 through 5 characterised in that a driven tool is used in the machining of the contour which has a linear movement of direction in at least one axis.
07. Process in accordance with the claims 1 through 5 characterised in that the generation of the contour is achieved exclusively by the movement of the compound rest.
08. Process in accordance with claims 1 through 7 characterised in that a thread program is used
09. Process in accordance with claims 1 through 8 characterised in that for at least two different address parameters one jerk sequence of address parameter values is used in the program block chain.
10. Process in accordance with one or several of the preceding claims, characterised in that for at least one of the address parameters the increments formed between the address parameter values of the program block chain are programmed as jerk sequences.
11. Process in accordance with one or several of the preceding claims, characterised in that the discontinuous contour is generated by the programming of a pilgrim-step

process in that the tool is traversed with a sequence of forward and backward movements whereby one of the movements is larger than the other.

12. Process according to one of the preceding claims, characterised in that the program block chain describes a rotationally symmetric contour with a superimposed non-monotonous periodic sequence of increments.
13. Process in accordance with one or several of the preceding claims for the cutting of discontinuous contour elements which protrude from an angled or curved shell surface whereby the side of the tool predominantly machines the flank of the discontinuous contour element and the tip of the tool predominantly machines the surface shell, characterised in that the tip of the tool is guided on a track which for the most part runs tangentially to the surface shell and in which the side of the tool is caused by a programmed modification of the tangential traverse speed and/or traverse direction to generate the flank of the discontinuous contour element.
14. Process in accordance with one or several of the preceding claims, characterised in that the overshoot behaviour of the mechanical and/or electronic systems of the lathe or the linear driven tool resulting for the jump command in the program is directly used for the generation of discontinuous, non-round or abruptly changing contours of crooked contours.
15. Process in accordance with claim 14 characterised in that the overshoot behaviour of the system is used for the direct creation of cutting edges with relief angles on threaded segments or blades
16. Process in accordance with claim 15 characterised in that the cutting edges are generated by at least partial milling of cutting grooves in the area of a section of the threaded blade resulting from the overshoot response of the system and representing the relief angle relict of the overshoot.

17. Application of the process in accordance with one or several of the claims 1 through 16 for the cutting production of special threads on screw-in bodies, e.g. for yielding material such as bone screws, hip bone screws, fusion bodies, screws for fixateur externe, screw-in posts for dental implants and screw-in artificial hip joint sockets in particular for the creation of neutral or any pinching or relief angles on the threaded blades.
18. Application of the process in accordance with one or several of the claims 1 through 16 for the cutting production screw-in artificial hip joint sockets with any outer contour of the shell surface for example spherical, paraspherical, conical, conical-spherical, parabolic, etc. and a thread on the shell surface which has a profile of the threaded teeth with any tooth position, e.g. angled neutrally or towards the pole of the socket and any pitch, e.g. constant or variable pitch, with individual threaded blades separated from one another by cutting grooves which create any desired relief angle on at least one of the threaded tooth surfaces.
19. Application of the process in accordance with one or several of the claims 1 through 13 for the cutting production of screw-in artificial hip joint sockets with any outer contour of the shell surface for example spherical, paraspherical, conical, conical-spherical, parabolic, etc. and a thread on the shell surface which has a profile of the threaded teeth with any tooth position, e.g. angled neutrally or towards the pole of the socket and any pitch, e.g. constant or variable pitch, with individual threaded blades separated from one another by cutting grooves which create so-called screw or screwed surfaces on at least one of the threaded tooth surfaces.
20. Application of the process in accordance with one or several of the above claims for the cutting production of screw-in bodies to create mutual swinging of the thread blades.

21. Process in accordance with one or several of the claims 1 through 4 and 6 through 11 characterised in that the non-round or discontinuous contour comprises a closed surface with repeating contour elements.
22. Application of the process in accordance with claim 21 for the production of circular wedge profiles or circular wedge couplings.
23. Screw-in artificial hip joint socket with any outer configuration of the shell surface for example spherical, paraspherical, conical, conical-spherical, parabolic, etc. and a thread on the shell surface which has a profile of the threaded teeth which tapers out towards the tooth head, e.g. as a pointed thread with any tooth position, e.g. angled neutrally or towards the pole of the socket and any constant or variable pitch whereby the threaded rib of the thread has individual threaded blades (35, 36) separated from one another by cutting grooves (44), characterised in that the individual threaded blades are formed by so-called screw or screwed surfaces which are generated by the rotation of a certain tooth profile with a pitch around the socket axis with a constant radial distance whereby sequential threaded blades have a larger radial spacing from those preceding it in the direction of screwing.
24. Screw-in artificial hip joint socket in accordance with claim 23, characterised in that the threaded blades are swung relative to one another in their extension with a small angle in the direction of the wind-up angle of the cutting grooves.
25. Screw-in artificial hip joint socket in accordance with claim 24, characterised in that the swing is in the direction of the windup of the cutting grooves.
26. Screw-in artificial hip joint socket with any outer configuration of the shell surface for example spherical, paraspherical, conical, conical-spherical, parabolic, etc. and a thread on the shell surface e.g. as a pointed or flat thread with any tooth position, e.g. angled neutrally or towards the pole of the socket and any constant or variable

pitch whereby the threaded rib of the thread has individual threaded blades (100, 101) separated from one another by cutting grooves (102, 103), characterised in that on the individual threaded blades there are cutting edges (105) formed by relicts of the overshoot behaviour of the system in preceding sections, whereby thread blades following in the direction of screw-in have cutting edges which protrude relative to the leading thread blades.

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